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ABSTRACT

A framework is presented for library instruction that integrates learning in the cognitive and affective domains. A study is reported that supports such a framework. Central to this instruction is the use of an overall strategy called FOCUS, FORMAT, FIND, and EVALUATE. The study compared the effects of two methods of academic library instruction on research process orientation; library anxiety; student performance on a task involving researching and compiling a bibliography, paper topic, and title; perceptions of the usefulness of the instructional sections; and attitudes about library instruction in general. The traditional instruction was research oriented and consisted of lectures and demonstrations. The cognitive-strategies instruction was process-oriented, emphasizing the research process itself rather than the use of specific sources. Subjects were 190 undergraduates in an English composition class. Pretests, posttests, and a survey with open-ended questions collected information. Results support the use of a domain-integrated process-oriented approach to academic library instruction. The cognitive strategies group showed greater improvement in research process orientation, more reduction in library anxiety, and most positive general attitudes about library instruction than did the traditional group. One table summarizes results of the study hypothesis testing. (Contains 24 references.) (SLD)

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ED 362 215

Title:

Thoughts, Feelings and Actions: Integrating Domains in Library Instruction

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Thoughts, Feelings and Actions:
Integrating Domains in Library Instruction

Presentation Handout

This presentation describes a framework for library instruction which integrates learning in the cognitive and affective domains. Central to this instruction is the use of an overall strategy called FOCUS, FORMAT, FIND and EVALUATE. Emphasized will be a demonstration the use of a FocusFramework which explores the problem formulation stage of research through a cooperative group activity. Although this instruction was designed to be used with first-year college composition classes, the strategy and Focus Framework have been adapted for use in a wide variety of other academic library instruction classes.

Background Concerns of Library Instructors

- Do students have overall concept of the research process?
- Does library instruction help them to develop this overall concept?
- Does library anxiety get in the way of library instruction?
- Can an emphasis on problem formulation give students a "jump-start"?
- Does library instruction have an effect on quality of the research paper?

Voices of the Experts

- Kuhlthau's concept of "research process orientation"
- Mellon's concept of "library anxiety"
- Tuckett & Stoffle's description of library research as problem-solving
- Nahl-Jakobovit's work in domain-integration in library skills development

Cognitive Strategies Instruction Designed

- First-year college composition course
- Three days; 50-minute periods
- Uses a cognitive framework: FOCUS, FORMAT, FIND, EVALUATE
- Addresses affective objectives at each stage of research
- Emphasizes problem formulation
- Incorporates group activities and cooperative learning
- Aims at intermediate and long-term goals

Research Study Designed

- Compares traditional lecture-based library instruction with cognitive strategies instruction
- Nonequivalent control group design with intact classes
- Pretest / Posttest of research process orientation, library anxiety, library attitudes
- Post-instruction measure of topic and title development (problem formulation)
- End-of-quarter measure of adequacy of research paper bibliographies

High Expectations

- More focused problem formulation
- Lower anxiety
- More positive attitudes
- Increased research process orientation
- Better research papers

The Results

- Most expectations met
- Successful adaptation to other courses
- A completed dissertation: A Cognitive Strategies Framework for Domain-Integrated Process-Oriented Library Instruction: The Effects on Research Process Orientation, Library Anxiety, Attitudes and Research Products of College Students, 1992

Summary of Performance Results of Hypotheses Testing

Dependent Variables	Pretest Differences Between Groups	Posttest Differences Between Groups	Gain Differences Between Groups	Gain Within Cognitive Strategies Group	Gain Within Traditional Group	Hypotheses Confirmed
Research Process Orientation	nsd	<.0001	<.0001	<.0001	<.01	yes
Library Anxiety	<.01	nsd	<.002	<.0001	nsd	yes
General Attitudes	nsd	nsd	<.01	<.0001	nsd	yes
Research Bibliographies	n/a	<.0001	n/a	n/a	n/a	yes
Usefulness of Instruction	n/a	nsd	n/a	n/a	n/a	no
Topic/Title Development	n/a	<.05 / nsd	n/a	n/a	n/a	yes / no

Overall, the cognitive strategies instruction was successful in improving research process orientation, reducing library anxiety, and improving general attitudes. Evidence for the effectiveness of the instruction was shown most impressively in the strong performance of the cognitive strategies group on the research paper bibliographies.

Evaluators observed more highly developed research paper topics among the cognitive strategies group, but did not find group differences in level of title development. The measure of perceptions of immediate usefulness of library instruction did not detect any significant group differences with both groups indicating strongly positive perceptions.

It is hoped that the empirical evidence of the effectiveness of the domain-integrated process-oriented instruction used as a treatment in this study will encourage librarians to design and implement such instruction. Libraries should make it their role to teach not only specific sources and procedures within the local library, but to teach the processes of life-long self-education in a worldwide, electronic environment. In this global view, the library is no longer the context for the learning process; instead, the context is the information society itself.

Thoughts, Feelings and Actions:
Integrating Domains in Library Instruction

RESEARCH SUMMARY, DISCUSSION, AND CONCLUSION

Summary

The purpose of this study was to compare the effects of two methods of academic library instruction on research process orientation (a construct developed by Kuhlthau), library anxiety (a construct developed by Mellon), student performance on the complex problem-solving task of researching and compiling a research paper bibliography, research paper topic and title development, perceptions of the immediate usefulness of the library instructional sessions, and attitudes about library instruction in general.

Two instructional treatments were designed for use in the library skills component of a college-level English composition class. Both the traditional treatment and the cognitive strategies treatment were designed to support achievement of the same terminal goal, that of completion of a successful, documented, library-based research paper. However, there were considerable differences between the treatments in both instructional content and teaching method.

The traditional instruction was resource-oriented and consisted of lectures and demonstrations which presented the basic tools and technologies used in library research. This type of procedural instruction is common in academic library settings. The emphasis of the instruction was to teach standardized procedures for student interaction with the library environment. No emphasis was placed on the process of research, except for a recommendation to start with general sources and proceed to specific sources. Affective and metacognitive learning were not addressed.

The cognitive strategies instruction was process-oriented, that is, it was based on and emphasized the research process itself rather than focusing on the use of specific information sources. The design of this instruction was based on a theoretical framework which combined conceptual models representing information searching as a type of problem-solving with grounded theories concerning affective and metacognitive aspects of information searching. The instruction was designed to integrate development of skills in all the domains of learning: cognitive skills for problem-solving, psychomotor skills for navigating in specific information environments, metacognitive skills for self-monitoring, and affective skills for self-motivation.

The subjects for this study were 190 undergraduate students enrolled in a required English composition class. The research design chosen for this study was a non-equivalent control group design with intact classes randomly assigned to the cognitive strategies group or the traditional group. The researcher, an experienced library instructor, taught all sections using a lecture and discussion format.

Several different types of evaluation instruments were employed in this study. The pretest, administered at the beginning of the quarter, included a survey which collected background demographic data. The pretest also included scales which measured research process orientation, general attitudes towards library instruction and library anxiety. Immediately after instruction, held mid-quarter, students were asked open-ended questions (on topic and research paper title development) and survey questions which measured student perceptions of the immediate usefulness of the library instruction sessions. The posttest, administered at the end of the quarter, repeated the research process orientation, general attitudes, and library anxiety scales. Finally, students' research paper bibliographies were scored at the end of the quarter using a scale which measured

adequacy of student performance. Copies of these instruments and protocols for their administration can be requested from the researcher.

It was expected that the cognitive strategies treatment would have more positive effects than the traditional treatment on research paper topic and title development, and on student perceptions of the usefulness of the library instructional sessions as observed immediately after instruction. It was also expected that the cognitive strategies treatment would result in higher student gains over the course of the academic term in research process orientation, attitudes about library instruction in general, anxiety reduction, and performance on the term paper bibliography.

Independent sample t-tests were conducted to determine differences between treatment groups on the research process orientation, library anxiety, and general attitudes measures of both the pretest and posttest. Additional independent sample t-tests compared gain scores between treatment groups on each of these measures. Paired sample t-tests were conducted on each portion of the pretest and posttest to determine the significance of gains in research process orientation, library anxiety and general attitudes within each treatment group. The ratings of student performance on the research paper bibliographies were also tested using an independent sample t-test, as was the student perception of the usefulness of instruction. The categorical data produced by measures of research topic and title development was analyzed using chi-square to determine differences between the groups.

A chi-square analysis of the Background Survey data revealed no significant differences between the treatment groups on such demographic factors as age, race, sex, academic status and grade point average. Independent sample t-tests conducted on the pretest data showed no differences between the groups in research process orientation or general attitudes. There was, however, evidence that the traditional group demonstrated significantly lower library anxiety than the cognitive strategies group on the pretest.

Overall, the cognitive strategies treatment was successful in improving research process orientation, reducing library anxiety, and improving general attitudes. Evidence for the effectiveness of this treatment was also shown by evaluator judgements of more focused research paper topics and titles among the cognitive strategies group and especially, in the strong performance of the cognitive strategies group on the research paper bibliographies. The measure of perceptions of immediate usefulness of library instruction did not detect any significant group differences with both groups indicating strongly positive perceptions.

Discussion of Findings

Research Process Orientation

The results of this study do support the hypothesis that research process orientation (RPO) for both treatment groups would increase significantly from the pretest measure at the beginning of the academic quarter to the posttest measure at the end of the quarter. The data also clearly indicate that the cognitive strategies group gained in RPO to a significantly greater extent than did the traditional group.

An increase in research process orientation from the beginning of the quarter to the end was to be expected simply due to the experience of conducting a research paper project from start to finish. Kuhlthau's studies (1988a; 1988b; Kuhlthau et al., 1990), which measured research process orientation at the beginning, middle and end of the research paper project, found an increasing level of RPO throughout the project. Kuhlthau's subjects, however, did not receive any kind of library instruction during the project. The present study is unique in measuring RPO in relation to library instruction.

The finding that library instruction which was specifically process-oriented and domain-integrated was more effective in increasing the RPO of students is

significant. The emphasis in the instruction on the affective and metacognitive elements of the research process in the framework of the cognitive strategy, FOCUS, FORMAT, FIND and EVALUATE, seemed clearly effective in increasing the RPO of the students. This finding supports a body of research which indicates that students can be helped to "learn how to learn" through direct instruction (Derry & Murphy, 1986). While direct experience of the research process is likely a factor in increasing research process orientation, the findings in this study indicate that process-oriented instruction may influence the development of RPO. Librarians who provide instruction for beginning researchers should be encouraged by these findings to design instruction which presents research as a process, and makes students aware of the integration of thoughts, feelings and actions inherent in the process.

Since this was the first study to examine changes in research process orientation in relation to library instruction, there is ample opportunity for researchers to explore this issue further. The present study looked at research process orientation as one of six dependent variables, and based measurement of it on only fifteen survey items. Future studies should better isolate this variable from other influences, and base measurement of it on a larger number of items in order to increase the reliability of the scale.

The research process as experienced by undergraduate students is being studied in a number of ways, both qualitative and quantitative. Fister (in press) has conducted in-depth interviews with students who were identified as having successfully completed research projects of various kinds. Her initial findings suggest that the students' experiences in finding a focus, using evidence, and articulating findings are strikingly different than the strategies frequently taught in library instruction. Content analysis of oral or written library user comments are being used by Nahl-Jakobovits and Jakobovits (1992) to develop user-based objectives in the affective, cognitive, and sensorimotor domains. Outside the field of library science, Carley and Palmquist (1992) are using computer-based tools to analyze written and spoken texts for the purpose of representing mental models of people in social situations. Using this technique, the researchers have extracted mental models of undergraduate students at the beginning and end points of a research paper assignment and compared the computer-generated maps.

Use of techniques such as those described above, combined with the basic work done by Kuhlthau, could lead to a deeper understanding of how the research process is carried out by individuals, and how it changes over time and with experience. Such an understanding would be valuable not only for librarians and library instructors, but for designers of instructional products. More and more reference books are being published in electronic formats such as CD-ROM; more information is available on electronic databases everyday. These sources, with their tremendous potential for interactive searching, should be designed with the human information searching process clearly in mind.

Library Anxiety

The results of this study do support the hypothesis that library anxiety for both treatment groups would decrease from the pretest measure at the beginning of the academic quarter to the posttest measure at the end of the quarter. However, while the decrease for the cognitive strategies group was significant, that of the traditional group was not. The data indicate that library anxiety in the cognitive strategies group was reduced to a significantly greater degree than in the traditional group. These findings support research which has shown that strategies training in metacognitive awareness (Meichenbaum, 1977) and the use of group activities (Ramey, 1985) have had positive effects on learner attitudes.

These findings, however, must be looked at in light of significant differences between the groups on the pretest library anxiety measure. Since the groups were not shown to be statistically equivalent at the outset, conclusions about the effects of the treatments should be looked at with caution.

Although the library anxiety scale was judged to be adequately reliable with a Cronbach Alpha Coefficient of .87, an item by item analysis shows a great deal of variability in student responses to individual items. Mellon (1986) had identified several probable sources of library anxiety including perception of self as inadequate, perception of others as more adequate, fear of technology, fear of approaching mediators, and generalized feelings of discomfort in unfamiliar situations. The items on the library anxiety scale were written to reflect these probable sources. From a visual examination of the data, it appears that there is wide variation in what students find to be anxiety-producing. Two students with exactly the same scores on the scale may not overlap at all in their perceptions of anxiety-producing situations.

This observation may have more than one explanation. It is likely that the library anxiety scale itself needs further study and refinement. Although the content of the items is based on theoretical principles and empirical evidence, the items themselves were written for this study and have not been validated by repeated use. Additional studies using these items, and others developed for the Library Anxiety Test Bank (available from the researcher), will help to resolve the question of the validity and reliability of the library anxiety scale.

Another possible explanation is simply that there is a great deal of variance in what people find threatening in a library environment. This explanation is supported by the daily observations of reference librarians. Although the acts of asking a librarian for assistance and threading a microfilm reader are quite different, they are both very common sources of anxiety among library users. It may be that the most valuable use of a library anxiety scale like this one would be for needs assessment purposes at the beginning of a course. Students identified as having certain types of library anxiety could be directed to individualized or small group activities which would assist in relieving that source of the problem.

General Attitudes

The hypothesis that students' attitudes about library instruction in general would improve from pretest to posttest was supported only for the cognitive strategies group. The cognitive strategies group did improve significantly from pretest to posttest, and did improve significantly more than did the traditional group. The traditional group showed an insignificant decline in attitudes.

The improvement in the attitudes of the cognitive strategies group supports using an instructional method which focuses on teaching the library research process, and, while doing so, includes relevant information about the library building, technologies, and library staff. Attitudes about libraries are difficult to change, especially since such attitudes have been developed over years of schooling and library use. According to Gagné (1985), in order to change attitudes, both the internal and external conditions of learning must be met. The internal conditions demand that the student have a conceptualization of the object, event, or person to which the changed attitude will be directed. In the case of negative attitudes towards libraries, it can be seen that there are multiple objects toward which those attitudes are directed. They include the building itself, the multiple technologies contained within it, the library staff, and more. But these negative attitudes are also directed toward the events, actions and situations of the library research process itself. The cognitive strategies treatment may have been successful due to that fact that the concept of the research process, an unfamiliar concept to most undergraduates, was taught directly.

Caution should be used in interpreting these results due to the small number of items (5) on the general attitudes scale. Scores for both groups represent moderately positive attitudes on both the pretest and posttest, with one item accounting for nearly all the negative responses. This item was "Classes which teach the library research process are interesting". Since the realm of library instruction included any class a student had ever participated in, the 49% answering "seldom" or "almost never" on the pretest was not surprising. Library

instruction has a common reputation for not being interesting. That only 42% of students gave those answers on the posttest was only slightly heartening.

Problem-Solving Performance: The Research Paper Bibliography

An important outcome of this study was the strong support for the hypothesis that concerns student performance on the problem-solving task of researching and compiling a research paper bibliography. Results of the study indicated that the research paper bibliographies of the cognitive strategies group were scored significantly higher on the Bibliography Rating Scale by two expert evaluators than were the bibliographies of the traditional group.

These results support the likelihood of an initial positive effect of giving students a problem formulation strategy, as suggested by Mellon (1984), as well as the positive cumulative effects of strategies through practice over time (Derry & Murphy, 1986). This study, like others which compared modes of instruction, supports the positive effect of cognitive strategies training on library skills (Arp & Wilson, 1984) and student research products (Kohl & Wilson, 1986).

This finding is significant in terms of both research and practice because of its relevance to a central issue concerning the effectiveness of library instruction. Much evaluation of library instruction has examined student perceptions of the value of instruction, student attitudes, preferences for teaching methods, and assessment of skills in using specific library resources. It has been assumed that library instruction contributes to better works of scholarship produced for actual course assignments, but there has been little empirical evidence of this contribution. This study presents such evidence using data gathered by a proven methodology (Dykeman & King, 1983) in which experts employed their professional judgement to evaluate the student bibliographies according to standardized criteria.

These results should provide some encouragement to practitioners in library instruction. Domain-integrated process-oriented instruction did appear to have a positive effect on the quality of the research paper bibliographies in this study; whether the research papers themselves were improved was not investigated. A study which investigated the relationship of the score on the Bibliography Rating Scale and the assigned term paper grade did not find strong correlation (Kohl & Wilson, 1986). The researchers attributed this lack of correlation to numerous factors other than the ability to access information which affect student grades. Researchers may wish to explore the relationship between bibliography ratings and grades on research papers in future research projects.

An incidental benefit of this part of the study was the interest sparked by the bibliography rating method. The expert evaluators were academic librarians, who regularly provide instruction similar to that given the traditional group. After the study was complete, both evaluators expressed an interest in continuing this type of evaluation in the future. Although time-consuming and labor-intensive, this activity provided access to student outcomes of instruction usually unavailable to the librarians. In post-study discussions, the evaluators expressed pleasant surprise at the quality of the student products. This methodology may be used in the future for evaluation of the Valdosta State College library instruction program.

Perceptions of Usefulness of Library Instruction

The results of this study did not support the hypothesis that the cognitive strategies group would report more positive perceptions of the immediate usefulness of library instruction than would the traditional group. The data indicate that the traditional group scored higher, although not significantly, on this measure than did the cognitive strategies group.

Both groups scored well above the midpoint of the range, indicating strongly positive perceptions of the usefulness of library instruction. Ninety-eight percent of the students who received instruction agreed or strongly agreed that the instructional sessions were useful in preparing them to begin their research

papers. On another question, only five percent of the students found the sessions to be a waste of time. Responses were similar for questions which dealt with specific steps of the research process. Although the traditional group did not receive specific instruction in the steps of the research process, they apparently did feel that the more resource-oriented instruction they received prepared them to undertake the research process.

A ceiling effect on the scores may be responsible for the failure to find differences between the groups. Ninety percent or more of all subjects responded positively or strongly positively on every usefulness item. Another explanation for the failure to find differences may be that, according to the student perceptions, the treatments were equally beneficial in preparing them to proceed with the research paper assignment. This student perception is supported by informal comments by the course instructors. All three of the English professors who had two classes participating (one in each treatment group) sat in on both treatments and were uniformly pleased with both class sessions.

Research Paper Topic and Title Development

The prediction that the treatment groups would differ in the level of development of the research paper topic and research paper title immediately after instruction was supported by the results of this study. As expected, the cognitive strategies group was more frequently judged to have narrowed or focused topics and titles than the traditional group.

These findings were very likely the result of the problem formulation strategy presented to the cognitive strategies group on the first day of instruction. Students in this group had had group practice in using a framing strategy to select and narrow their research paper topics, and had been given copies of the strategy worksheet (available from the researcher) for their own personal use. Students in the traditional group had been encouraged to narrow and focus their topics, but had not had any specific instruction on how to do so. Library instruction which is closely integrated with assignments has been found to be more effective than general instruction (Oberman, 1984).

There was some threat to the internal validity of this measure due to history bias. Due to timing and due date differences in various professors' assignments, some students may have felt a strong necessity to narrow their topics and generate their term paper titles by the last day of library instruction, while others were on a less immediate time schedule. Future researchers should control for that threat by negotiating uniform assignments and due dates with the professors.

General Discussion

Overall, the results of this study support the use of a domain-integrated process-oriented approach to academic library instruction. The cognitive strategies group showed greater improvement in research process orientation, more reduction in library anxiety, and more positive general attitudes about library instruction than did the traditional group. Moreover, the cognitive strategies group demonstrated more developed research paper topics and titles, and, most importantly, were judged to have compiled more adequate research paper bibliographies than the traditional group. Student perceptions of both methods of instruction were strongly positive.

Certain limitations of the study may undermine the generalizability of these positive findings. The investigation was limited to a single field experiment conducted at one institution. One individual taught all the library instruction sections, thus making it difficult to establish that the results could be applied to other people in other times and places. Other studies that evaluate instruction based on the cognitive strategies treatment method may help in providing evidence for the external validity of this study.

The fact that only one person taught the classes also may bring into question the internal validity of the study. The researcher administered both of the treatments, thus acting as both investigator and teacher. There were

practical considerations which led to the decision to administer the treatments in this way. The treatment was long, consisting of three hours of instruction on three consecutive days. Due to job assignments, it was not possible to schedule another librarian for the twenty-four hours of instruction necessary for the eight intact classes. Consideration was given to training several other librarians to share in administering the treatments. This option appeared to be unworkable due to the training time required and the likelihood of introducing teacher effect, a threat to internal validity.

Experts in experimental research strongly discourage the dual role of investigator and teacher due to the inherent danger of experimenter bias (Barber, 1973). This bias can be introduced in several ways including failure to follow protocol. If the experimenter deviates significantly from the specified treatment, the study that is actually conducted may not be the same as the one that is reported. Another way this bias can be introduced is through the expectancy effect. Experimenters (and teachers) commonly expect certain results; they expect that one group will perform differently from the other. This expectancy may result in an unconscious and unintentional influence which may affect the outcome.

To minimize these problems, care was taken to follow the instructional treatments precisely and uniformly. Evidence that this was done can be seen in the similarity of student perceptions of the usefulness of library instruction as measured immediately after instruction. Further evidence can be provided by the English professors who sat in on the instructional sessions. In informal observations, all those who had sections taught by both methods found the sessions to be equal in quality. A formal observation checklist, including such criteria as accuracy, interaction, friendliness, comprehensiveness, etc., would have been useful in documenting these observations.

Taking into account the limitations outlined above, the findings of this study do add to the relatively small body of empirical evidence concerning the effectiveness of process-oriented instruction. Studies of ongoing library instruction programs based on the process approach (Lynch, 1989; Mellon, 1984; Pask & Smith, 1989) are expected to increase this body of evidence. More studies are needed, not only to evaluate the effectiveness of programs on students' library research skills, but to examine the wider and more long-range effects on lifelong information skills.

Practically speaking, the cognitive strategies treatment has been implemented as the method of library instruction used at Valdosta State College. Other librarians have learned the method and have improved upon it; ongoing program evaluation may prove to add useful information in the future.

Conclusion

The basic concern which led to this study was a desire to make library instruction more appropriate to the needs of users today and in the future. Information is today considered to be the basis of the economic, social, and political structure of our society. In this society, people must have self-directing information management skills which are adaptive to changing technologies and environments.

A review of the literature of library and information science, as well as that in learning theory, suggested that the skills needed by a self-reliant information manager were similar to those involved in problem-solving (Dervin, 1977; Gagné, 1985; Reichel, 1987). Field studies by Kuhlthau (1983, 1988a, 1988b) investigated the process of library research, and provided data which support the problem-solving model and led to the development and validation of a new model of the research process (Kuhlthau, Truock, George & Belvin, 1990). This model included not only the actions taken by researchers, but their corresponding thoughts and feelings as well. Kuhlthau's work provided the construct of research process orientation, one of the dependent variables used in this study. The cognitive strategies method of library instruction was shown to increase research process orientation in the context of this study. If this

improvement is repeated over a broad range of conditions and instruction, this could be seen as a step toward the goal of developing self-reliant information managers (Lechner, 1989).

A number of researchers have suggested that anxiety is a major problem which must be overcome in order for library users to be able to take full advantage of library instruction and library use (Kuhlthau et al., 1990; Mellon, 1986). Mellon (1986) documented students' attitudes about libraries and the search process, and identified probable sources of fears and anxiety. Her work was important in developing the construct of library anxiety, used as a dependent variable in this study. The cognitive strategies method of library instruction was shown to decrease library anxiety in the context of this study. If this reduction occurs repeatedly in other contexts, this too may support the goal of self-reliance in information searching (Lechner, 1989; Nahl-Jakobovits & Jakobovits, 1985).

The other dependent variables of general attitudes about library instruction, perceptions of usefulness of library instruction, research topic and title development and performance on the research paper bibliography measured the more immediate goals of library instruction. Student achievement of these immediate goals provides evidence of movement toward the achievement of long-term goals such as self-reliance in information searching (Lechner, 1989).

It is hoped that the empirical evidence of the effectiveness of the domain-integrated process-oriented instruction used as a treatment in this study will encourage librarians to design and implement such instruction. Libraries should make it their role to teach not only specific sources and procedures within the local library, but to teach the processes of life-long self-education in a worldwide, electronic environment. In this global view, the library is no longer the context for the learning process; instead, the context is the information society itself.

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